CLAIMS

WHAT IS CLAIMED IS:

1. A branched polylactic acid derivative of formula 1:

<formula 1>

$I-(R-X)_n$

Wherein,

R is $-[R_1]_k-[R_2]_m-$,

wherein R_1 is -C(=O)-CHZ-O-,

R_2 is -C(=O)-CHY-O-, $-C(=O)-CH_2CH_2CH_2CH_2CH_2-O-$ or $-C(=O)-CH_2-O-CH_2CH_2-O-$, wherein each of Z and Y is hydrogen, methyl, or phenyl,

k is an integer of 1-30,

m is an integer of 0-30;

X is $-C(=O)-(CH_2)_a-C(=O)-O-M$, wherein a is an integer of 0-10, M is hydrogen, sodium, potassium, or lithium;

I is diol or polyol having 3-12 hydroxy groups;

n is an integer of 2-12, and is same as the number of hydroxy group that I has.

2. The polylactic acid derivative according to claim 1, wherein the branched polylactic acid derivative has the number average molecular weight of 1,000-18,000 Dalton.

3. The polylactic acid derivative according to claim 1, wherein R is mono polymer or copolymer which is one or more selected from the group consisting of lactide, glycolide, caprolactone, 1,4-dioxane-2-one, and mandelic acid.

4. The polylactic acid derivative according to claim 1, wherein M is sodium, potassium or lithium.

5. The polylactic acid derivative according to claim 1, wherein I is selected from ethyleneglycol, propanediol, butanediol, pentanediol, hexanediol, glycerol, erythritol, threitol, pentaerythritol, xylitol, adonitol, sorbitol, mannitol, palatinose, maltose monohydrate, maltitol, or D-raffinose pentahydrate.

6. The polylactic acid derivative according to claim 1, wherein micelles are formed in aqueous solution of pH 4 or more.

7. A preparation method of the polylactic acid derivative according to one of claims 1 to 6, comprising the steps of :
   1) polymerizing monomer of lactides in the presence of an initiator and catalyst to obtain a branched polylactic acid;
   2) dissolving the branched polylactic acid obtained in step 1) in water-miscibile organic solvent, purifying the branched polylactic acid by adding aqueous solution of pH 7 or more, and drying in vacuum, to obtain powder form of the branched polylactic acid; and
   3) reacting the branched polylactic acid derivative obtained in step 2) with succinic anhydride or dichloride compound to obtain the branched polylactic acid derivative containing carboxy terminal group.

8. The preparation method of the polylactic acid derivative according to claim 7, further comprising the step of adding an alkali metal salt to the branched polylactic acid derivative obtained in step 3) to obtain the branched polylactic acid derivative containing carboxy alkali metal salt terminal group.

9. The preparation method according to claim 7, wherein the initiator of step 1) is selected from ethyleneglycol, propanediol, butanediol, pentanediol, hexandiol, glycerol, erythritol, threitol, pentaerythritol, xylitol, adonitol, sorbitol, mannitol, palatinose, maltose monohydrate, maltitol, or D-raffinose pentahydrate.

10. The preparation method according to claim 7, wherein in step 3, the branched polylactic acid derivative is reacted with the compound which is selected from a group consisting of succinic anhydride, oxalyl chloride, malonyl chloride, succinyl chloride, glutaryl chloride, adipoyl chloride, sebacoyl chloride, and dochecadioyl dichloride.

11. The preparation method according to claim 8, wherein the alkali metal salt is selected from a group consisting of sodium hydrogen carbonate, sodium carbonate, potassium hydrogen carbonate, potassium carbonate, and lithium carbonate.

12. A composition for poorly water-soluble drug delivery agent containing the polylactic acid derivative according to any one of claims 1 to 6.

13. A pharmaceutical composition containing the polylactic acid derivative according to any one of claims 1 to 6 and poorly water-soluble drugs.